



An Embedded System in Passenger Car for Road Safety

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ABSTRACT: Each year, there are thousands of highway deaths and tens of thousands of serious injuries due to "Run-Off-Road" accidents. Everything from simple driver inattentiveness, to fatigue, callousness, to drunk driving, is responsible. Simple sensors can be fitted inside vehicles embedded with various features like, automatic collision notification, vehicle security, speed control which can give impetus to an efficient road safety system. The features that are proposed in this work are: Automatic collision notification that gives notification to the victim's relative, Red light traffic control makes sure vehicle doesn't break signal, Speed control alters speed in different zones, Horn control prevents honking in horn prohibited zone, Alcohol detection detects drunk driving and Vehicle security is used to prevent theft.

KEYWORDS: Embedded System, Collision Notification, GSM (Global System for Mobile Communication), GPS (Global Positioning System).

I. INTRODUCTION

Road traffic crashes are one of the world's largest public health and injury prevention problems. According to the World Health Organization (WHO), more than a million people are killed in road accidents, each year, all over the world. A report published by the WHO in 2009 revealed that more people die on roads in India than anywhere else in the world. The statistics for India are chilling. At least 13 people die every hour in road accidents in the country; the latest report of the National Crime Records Bureau reveals. In 2007, 1.14 lakh people in India lost their lives in road mishaps. Poor road infrastructure, failure to comply with speed limits, growing drinking and driving habits are among the main factors contributing to deaths from road crashes, WHO said in its report on 'Decade of Action for Road Safety 2011-2010'. Currently Road safety systems are available in high end luxury cars such as Audi, Mercedes Benz etc. to name a few. Example: OnStar Corporation provides subscription-based communications, in-vehicle security, hands free calling, turn-by-turn navigation, and remote diagnostics systems throughout the United States, Canada and China. A similar service is known as Chevy Star in Latin American markets. OnStar FMV became available to the public on July 24, 2011. It provides some of the features an OEM system has, such as Automatic Crash Response, Stolen Vehicle Tracking, Turn-by-Turn Navigation, and Roadside Assistance.

The motivation behind the project Travolution is an attempt to make an embedded system which is to bring a positive difference in the field of road safety and road discipline. The project tackles some major causes of road accidents such as breaking traffic signals and drunken driving. It also has a major objective of exercising road discipline such as speed control in different areas and horn control in horn prohibited zones. The requirement of embedded systems is the need of the hour in developing countries & especially with the grim statistics of our country, the need is imminent. Thus incorporation of these features should be mandatory in all cars in the near future without cutting into the customer or the manufacturer's pockets.

The features added in this work are: Vehicle Speed Control in Variable Zone- in this feature, speed of the vehicle is controlled in different areas such as flyovers, bridges, highways, schools, cities and internal areas. Horn Control of Vehicle in No Honking Zone- Control unwanted disturbances in horn prohibited zones such as hospitals, public libraries, courts, schools etc. Red Light Traffic Control- In this feature the vehicle is controlled on traffic signal, when signal is red the vehicle is automatically stopped. Automatic Collision Notification- In this feature when vehicle meet with an accident, the system of this project sends messages (SMS) via GSM Modem to control room and the nearest

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

relative of the victim. Vehicle security- In this feature, if the vehicle is stolen or someone tries to break in, theft sensor is activated and message is sent to the police control room and to the owner if the vehicle via GSM modem. Alcohol Control- The alcohol sensor prevents the ignition key from working if the driver breathes into it and a significant quantity of alcohol is detected. Consequently message is sent to the RTO.

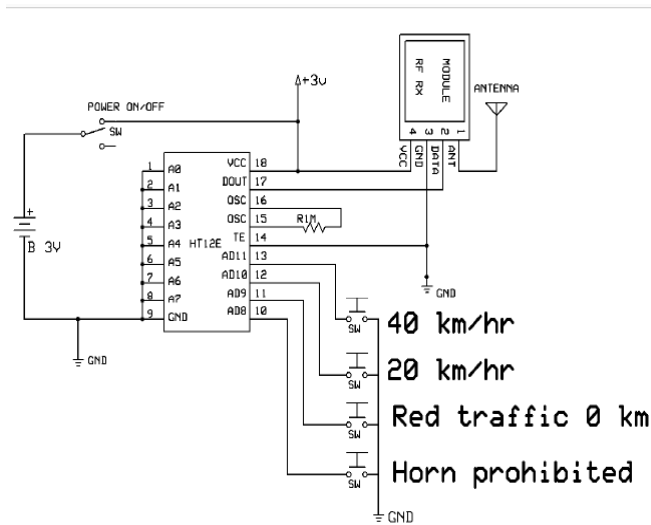


Fig. 1. Transmitter Circuit

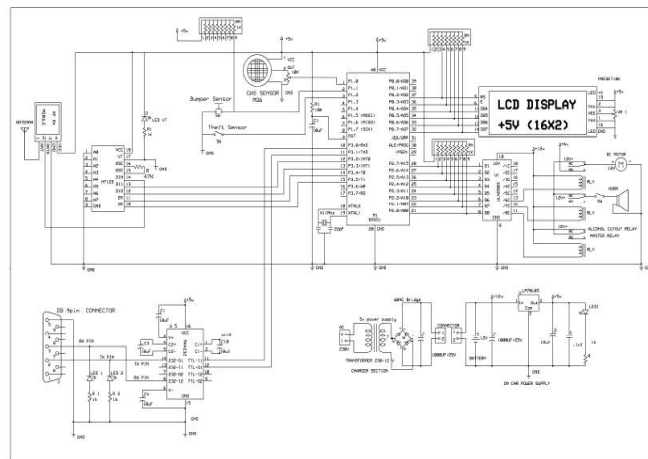


Fig. 2 Receiver Circuit

II. CONCLUSION

With this prototype, a cost effective embedded system has been successfully implemented which helps in curbing road accidents and flouting of traffic rules while also providing security for the vehicle.

REFERENCES

- [1] http://www.who.int/violence_injury_prevention/publications/road_traffic/world_report/en/ [Date of Access: June 26, 2013].
- [2] http://articles.timesofindia.indiatimes.com/2009-08-17/india/28181973_1_road-accidents-road-fatalities-global-road-safety [Date of Access: June 26, 2013].



ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 5, May 2016

- [3] http://zeenews.india.com/news/nation/india-no-1-in-road-accidentdeaths_704455.html [Date of Access: June 26, 2013].
- [4] <http://www.engineersgarage.com/electronic-components/ht12e> [Date of Access: July 15, 2013].
- [5] <http://www.sproboticworks.com/products/gsm-gps/sim-300-module.html> [Date of Access: July 16, 2013].
- [6] <https://www.sparkfun.com/products/8880> [Date of Access: July 19, 2013].
- [7] http://www.allaboutcircuits.com/vol_4/chpt_5/2.html [Date of Access: July 22, 2013].
- [8] <http://www.engineersgarage.com/tutorials/89s51-89s52-programmerbasics?Page=1> [Date of Access: August 9, 2013].
- [9] http://www.rhydolabz.com/documents/gps_gsm/GPS1269_UserManual.pdf [Date of Access: 17 March, 2014].
- [10] <http://en.wikipedia.org/wiki/MAX232> [Date of Access: August 7, 2013].
- [11] <http://www.expresspcb.com/> [Date of Access: August 11, 2013].
- [12] <http://chemistry.about.com/b/2012/11/10/can-you-beat-a-breathalyzertest.html> [Date of Access: September 5, 2013].
- [13] <http://searchmobilecomputing.techtarget.com/definition/rain-fade> [Date of Access: September 10, 2013].
- [14] <http://www.engineersgarage.com/tutorials/at-commands> [Date of Access: September 15, 2013].
- [15] <http://en.wikipedia.org/wiki/OnStar> [Date of Access: July 15, 2013].
- [16] Benliang Li, Houjun Wang, Bin Yan and Chijun Zhang, “The Research of Applying Wireless Sensor Networks to Intelligent Transportation System IT Based On IEEE 802.15.4”, 6th International Conference on ITS Telecommunications Proceedings, pp. 939-942, 2006.
- [17] Y. Cui and S. S. Gee, “Autonomous vehicle positioning with GPS in urban canyon environments; IEEE Transactions on Robotics and Automation”, vol. 19, pp. 110, 1 February 2003.
- [18] Samer Ammoun, Fawzi Nashashibi, Claude Laugeau, “Real-time crash avoidance system on crossroads based on 802.11 devices and GPS receivers; in proceedings of the IEEE ITSC 2006, IEEE Intelligent Transportation Systems Conference Toronto”, Canada, September 2006.
- [19] Mikael J. Pont, “Programming Embedded Systems using C”, 2002
- [20] https://www.egr.msu.edu/eceshop/Parts_Inventory/display_part_details.php?Part_Index=415 [Date of Access: March 22, 2013].
- [21] http://www.vexrobotics.com/wiki/Bumper_Switch [Date of Access: March 22, 2013].
- [22] <http://electronicdesign.com/embedded/programmer-flash-based-csupport-ics> [Date of Access: March 3, 2013].